

★ PLUMBING, HEATING, AIR
COPPER PIPE AND FITTINGS FOR
CONDITIONING AND INDUSTRIAL USE



STREAMLINE

STREAMLINE
PIPE AND FITTINGS DIVISION
MUELLER BRASS CO.
PORT HURON, MICHIGAN

STREAMLINE

PIPE AND FITTINGS DIVISION

MUELLER BRASS CO.

PORT HURON, MICHIGAN

The Company

The Mueller Brass Co. of Port Huron, Michigan, of which STREAMLINE Pipe and Fittings is a division, was incorporated in 1917 and during its industrial life has contributed some outstanding advances to industry. Immediately after the World War its executives had the vision to see the commercial possibilities in brass forgings which, previously, were confined almost solely to the manufacture of munitions. The Mueller Brass Co. is recognized as one of the world's largest manufacturers of brass forgings. The Company's contribution to the electric refrigeration industry has probably more to do, than any other factor, in bringing it to the state of perfection that it has attained today.

In 1924 the Mueller Brass Co. invented and marketed a product known as Mueller Copper Service Pipe and Fittings for waterworks service use. In a few short years this product has become standard

with an ever-growing number of waterworks systems throughout the United States and Canada.

The Mueller Brass Co.'s latest and most revolutionary advance for plumbing, heating and industrial uses is their product known internationally as STREAMLINE Copper Pipe and Fittings described and illustrated in this catalog.

Reliability

The Mueller Brass Co.'s rating in Bradstreet's is over one million dollars—first grade of credit.

Complete control from virgin metal to finished product, including extensive engineering and laboratory facilities, is an outstanding feature in this organization. No new product is ever put upon the market without having successfully passed tests far beyond those which it would ever be called upon to withstand.

Mechanical Features of the STREAMLINE Fitting

The STREAMLINE Solder Fitting is the outstanding revolutionary advance of the age to the development of plumbing and heating. The STREAMLINE Fitting also assures an absolutely tight connection for industrial uses, in electric refrigeration work, gas, oil, air and vacuum lines, or for the handling of liquids of low specific gravity, such as gasoline, butane, etc., which readily seep through threaded connections. It is a fitting made for the experienced plumber or steamfitter and requires a mechanic's skill and tools to connect.

The STREAMLINE Solder Fitting is a radical departure from any method heretofore used in that it is not connected by threading or flaring but by soldering. This operation is performed by feeding wire or stick solder through a feed hole in the fitting after STREAMLINE copper pipe has been assembled in it, and sufficient heat applied with the blow-torch.

The liquefied solder is carried around the entire surface between the pipe and fitting by capillary attraction, and becomes immediately visible as a bright line at the outer edge between the pipe and fitting, thus affording unfailing visual evidence that a leakproof,

bonded joint has been completed. **No previous tinning whatever is necessary.**

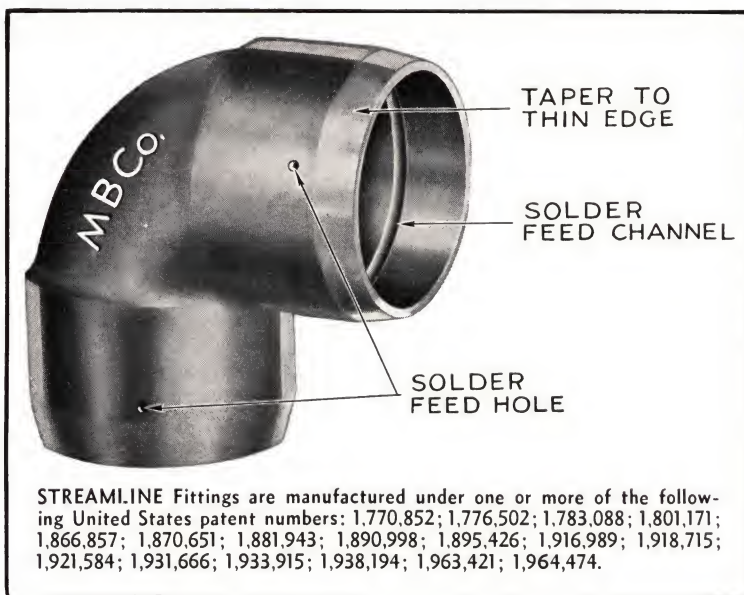
There are several distinct mechanical features utilized in the construction of STREAMLINE Fittings. The machined openings in the fittings as well as the diameter of the STREAMLINE copper pipe are held to very close tolerances so that when the pipe is assembled in the fitting, it fits snugly.

The distance to which the pipe may be inserted in the fitting is made positive by a shoulder in the fitting itself against which the pipe rests. This shoulder is approximately the same height as the thickness of the pipe wall, thus insuring a continuous uninterrupted waterway, and reducing flow resistance to a minimum.

All STREAMLINE Solder Fittings are furnished with the solder feed hole drilled. The solder feed hole is located immediately above solder feed channel.

The tapered ends of the fitting hasten the cooling of the solder at this point and form a solder gate.

A joint made with STREAMLINE Solder Fittings to STREAMLINE Copper Pipe is, in contrast to all other methods of connection, actually much stronger than the pipe itself.





Making a Connection with STREAMLINE Fitting to
Copper Pipe

The Phenomenon of Capillary Attraction

The phenomenon of capillary attraction is utilized in making a connection with STREAMLINE Solder Fittings and Copper Pipe. Capillary attraction is that property which liquids possess of rising or being drawn up above their normal levels through close fitting surfaces or capillary channels.

The harnessing or utilizing of this natural law is one of the basic principles on which the STREAMLINE Fitting is constructed and upon which it depends for success. The successful functioning of this natural law in making connections with STREAMLINE Solder Fittings and Copper Pipe depends upon close tolerances and clean, fluxed surfaces. STREAMLINE Fittings are designed for, and are most successfully used with STREAMLINE Copper Pipe.

Note This Particular Feature

It does not make the slightest difference where the solder feed hole is located when making a connection. Many operators who are not thoroughly familiar with installing this material erroneously conclude that the solder feed hole must be located at the top. This naturally leads to some doubt in their minds as to how the solder could be fed in if they were working against a partition or ceiling on which the feed hole, owing to the position of the fitting in the line was located at the bottom or side. As a matter of fact, the solder will feed just as readily from these positions as from the top. Owing to the never failing phenomena of capillarity, the solder will flow up, down or laterally with equal facility, and the operator can just as readily make a perfect joint by applying the solder through the feed hole located at the bottom or side as he can if it is located at the top.

Strength of Patented Joint



Sectional View of the Joint

$\frac{3}{4}$ -in. coupling and pulled in the Olsen testing machine, it requires the enormous pull of approximately nine thousand pounds to fracture the pipe while the joint remains invariably intact without the slightest sign of damage of any kind. In other words, the joint is very much stronger than the pipe itself. The pipe used in these tests was Extra Heavy .065 wall thickness.

Photomicrographs and innumerable tests have conclusively proved that a joint made with STREAMLINE Copper Pipe and Fittings is actually a perfect bond of pipe, solder and fitting. This patented joint is of such amazing strength that if two $\frac{3}{4}$ -in. sections of pipe are connected with a

Assurance of a Leak-Proof Connection by Visual Inspection Is an Exclusive Feature of the Patented Joint

After a STREAMLINE Solder Fitting and copper pipe have been cleaned, fluxed, assembled, and heated to the proper temperature with the blow torch, the solder is introduced through the feed hole in the fitting. The feed hole, as you will note, is located immediately above the feed channel at a point equidistant from the internal shoulder against which the pipe rests and the outer edge of the fitting.



Feed the solder through the feed hole only. In no other way can you be absolutely sure by visual inspection that a perfect leak-proof bond has been accomplished. This is a feature which no other connection possesses

bonding—attempts to feed from the end are, at the best, merely guesswork, because there is no evidence whatever, visual or otherwise, without an actual pressure test, that a leak-proof joint has been completed, and even the test does not prove that there is a thorough distribution of solder.

If the solder is fed from the end of the fitting, practically all the operator can do is to hope that it has been evenly distributed. It may go thoroughly in on one side and not fill up the other, or it may even make a continuous ring around the fitting, while the whole area back of the ring is not soldered.

The STREAMLINE Solder Fitting is the only fitting on the market which has the valuable visual inspection feature, and assurance of a perfect leak-proof connection.

The never failing phenomenon of capillary attraction distributes the solder outward and inward over the entire area between pipe and fitting. The first indication that this solder film has bonded these two surfaces is the appearance of a ring of tiny dark green bubbles around the pipe at its junction with the fitting. This is the hot flux, which is being forced out of the space between the pipe and fitting by the outward flow of the solder. When these bubbles are wiped off, a continuous bright ring of solder is visible at the end of the fitting. (See illustration.)

This is a visual and never failing proof that a tight and perfect joint has been made. Expansion will not work it loose, vibration cannot make it leak.

Never, under any circumstances, should the solder be fed from the outer edge of the fitting, but invariably through the feed hole only. The important point to remember is that the solder is fed **into** a STREAMLINE Solder Fitting and must flow outwards evenly, consequently its appearance in a continuous ring at the end of the fitting is a positive indication of thorough

How to Make Joints

1. Cut pipe square with fine hack saw (use 32 tooth saw preferably). Remove burr.
2. USING SANDCLOTH, SANDPAPER, or STEEL WOOL, thoroughly clean outside end of copper pipe equal to depth of fitting. Leave no dark spots.
3. USING SANDCLOTH, SANDPAPER, or STEEL WOOL, thoroughly clean inside of fitting where pipe is to be inserted. Use scraper, if necessary, for cleaning groove or feed hole.
4. Apply a coat of STREAMLINE Soldering flux to outside of pipe and inside of fitting. Be sure that the flux is distributed evenly. Make certain that there is plenty of flux in the feed hole also. In extremely cold weather warm fitting slightly with torch to approximate room temperature (70 to 80 degrees).
5. Slip pipe into fitting until it will go no farther and turn back and forth once or twice to further insure an equal distribution of the flux.
6. Use only STREAMLINE Special Solders as they are expressly prepared for this work.
7. Using a blow torch or gas tip, melt a drop of solder into the solder feed hole. Apply heat around fitting until drop of solder disappears, indicating that the proper temperature has been reached. Where feed hole is located at side or bottom, the proper temperature may be ascertained by touching the heated fitting with the end of the solder wire, (preferably in the feed hole)—when solder melts upon contact, the proper temperature for soldering has been reached. **Feed solder through feed hole ONLY until it appears around the end of the fitting for the full pipe circumference.** Now remove the flame and a second or two later, as the connection starts to cool, completely fill feed hole with solder and remove surplus with a small piece of cloth. Bonding the surfaces and filling the hole should be done completely in ONE HEATING OPERATION. A little experience soon enables the operator to make perfect solder joints.
8. It is advisable on sizes larger than 1 1/4" to move the fitting on the pipe or tap with hammer when the solder starts in, thus breaking the surface tension and insuring equal distribution. When making connections with larger sizes of STREAMLINE fittings (3" to 10" inclusive), the procedure for soldering although fundamentally the same as given here for the smaller sizes, is best performed with a knowledge of certain tips and instructions that facilitate the work. A complete set of instructions for the larger sizes will be furnished upon request.



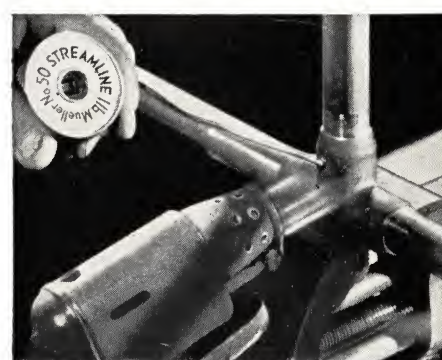
1 Cut pipe to length and remove burr with a file or scraper.



2 Clean outside of pipe and inside of fitting with sandpaper or sandcloth.



3 Apply flux to outside of pipe and inside of fitting.



4 Heat the pipe and fitting with blow torch. Feed solder through hole only. When solder shows at end of fitting remove heat and fill hole.

CLASSIFICATION OF STREAMLINE COPPER PIPE (HARD)

TYPE O—Hard STREAMLINE Copper Pipe may be used for water lines for non-shock pressures not over 125 lbs. This is largely used in pulp and paper mills.

TYPE M—(Federal Specification WW-T-799 and A.S.T.M. B 88-33) ; principal use is for plumbing. Also largely used for gas services, compressed air, low pressure steam, hot water heating lines and for water piping for non-shock pressures not over 200 lbs. Large sizes used for paper mill, brewery, distillery, and other industrial piping.

TYPE L—(Federal Specification WW-T-799 and A.S.T.M. B 88-33) ; principal use is for plumbing. Also used for gas services, hot water and low pressure steam and return lines, compressed air and industrial piping and water piping with non-shock pressures not over 250 lbs. Steam piping at pressures not over 65 lbs. or 310° F. This temperature limit is imposed by the solder used with the fitting.

TYPE K—(Federal Specification WW-T-799 and A.S.T.M. B 88-33). This is used for all purposes when higher than usual pressures are to be carried and for hot water piping where water conditions demand unusual corrosion resistance.

It may be used for non-shock water pressures not over 400 lbs. and for steam not over 65 lbs. or 310° F. This temperature limit is imposed by the solder.

Note—Hard pipe is not primarily intended for bending (see below for soft classification). It is for use with STREAMLINE Solder Fittings and shipped in straight lengths of 20 feet.

CLASSIFICATION OF STREAMLINE COPPER PIPE (SOFT)

TYPE L—Soft STREAMLINE Copper Pipe is recommended for work requiring bends, flares, concealed replacements and repairs, hot and cold water, compressed air and vacuum lines, for working pressures up to 150 pounds and on steam (saturated) up to 65 pounds gauge, or 310° F. (See below for Steam Applications.)

Note—See TYPE K Soft STREAMLINE Copper Pipe for Government Specifications and for underground use.

TYPE K (Federal Specification WW-T-799 and A.S.T.M. B 88-33) ; recommended for underground use and work requiring bends, flares, concealed replacements and repairs, hot and cold water, compressed air and vacuum lines for working pressures up to 250 pounds, and on steam (saturated) up to 65 pounds gauge, or 310° F. (See below for Steam Applications.)

Note—Soft pipe can be bent without annealing. It is for use with STREAMLINE Fittings and is shipped crated in coils of 30 to 60 ft. lengths up to and including 1 inch nominal pipe size, or in straight lengths of 20 feet in all sizes.

The larger the size the more difficult it is to make satisfactory bends without proper equipment.

When installing this pipe it is advisable to use the STREAMLINE Sizing Tools, which are furnished in sizes up to 2 inches inclusive.

STEAM APPLICATIONS—IMPORTANT!

Pressure allowed for steam is less than that allowed for air, water, etc., because the temperature of the pipe must not exceed the safe working temperature of the solder used to connect the fitting.

In a steam installation (where temperature increases with pressure) the successful application of STREAMLINE Copper Pipe and Fittings depends upon the solder used to make the connections as well as upon the thickness of the pipe.

For steam pressures up to 15 pounds use No. 50 STREAMLINE Solder and No. 50 STREAMLINE Flux.

For steam pressures from 16 pounds to 65 pounds, use either No. 95 or No. 104 STREAMLINE Solder and No. 50 STREAMLINE Flux.

For steam pressures in excess of 65 pounds, write home office—STREAMLINE PIPE AND FITTINGS DIVISION, Mueller Brass Co., Port Huron, Michigan.

General Properties of STREAMLINE Copper Pipe

CLASSIFICA- TION	Nominal pipe size	Outside diam.	Stubbs gauge	Decimal equiv. of wall thickness	Actual inside diam.	Actual net copper area sq. in.	Weight per foot, lbs.	O.D. tolerance
TYPE "O" HARD 125 Lbs. Max. Working Pressure	3	3 1/8	18	.049	3.027	.4735	1.834	3.125 + .002 — .001
	4	4 1/8	17	.058	4.009	.741	2.87	4.125 + .002 — .002
	5	5 1/8	16	.065	4.995	1.034	4.00	5.125 + .002 — .002
	6	6 1/8	15	.072	5.981	1.370	5.31	6.125 + .002 — .002
	8	8 1/8	14	.083	7.959	2.097	8.12	8.125 + .002 — .002
	10	10 1/8	12	.109	9.907	3.431	13.28	10.125 + .002 — .002
	12	12 1/8	10	.134	11.857	5.06	19.55	12.125 + .002 — .002
Govt. Type "M" HARD 250 Lbs. Working Pressure	1/4	3/8	23	.025	.325	.0275	.106	.500 + .001 — .0005
	3/8	1/2	23	.025	.450	.0373	.144	.500 + .001 — .0005
	1/2	5/8	22	.028	.569	.0526	.203	.625 + .001 — .0005
	3/4	7/8	21	.032	.811	.0848	.328	.875 + .001 — .0005
	1	1 1/8	20	.035	1.055	.1199	.464	1.125 + .0015 — .0005
	1 1/4	1 3/8	19	.042	1.291	.1759	.681	1.375 + .0015 — .0005
	1 1/2	1 5/8	18	.049	1.527	.2429	.94	1.625 + .002 — .000
	2	2 1/8	17	.058	2.009	.3766	1.46	2.125 + .002 — .000
	2 1/2	2 5/8	16	.065	2.495	.5229	2.03	2.625 + .002 — .001
	3	3 1/8	15	.072	2.981	.6909	2.68	3.125 + .002 — .001
	3 1/2	3 5/8	14	.083	3.459	.924	3.58	3.625 + .002 — .002
	4	4 1/8	13	.095	3.935	1.204	4.66	4.125 + .002 — .002
	5	5 1/8	12	.109	4.907	1.719	6.66	5.125 + .002 — .002
	6	6 1/8		.122	5.881	2.305	8.91	6.125 + .002 — .002
	8	8 1/8		.170	7.785	4.249	16.46	8.125 + .002 — .002
	*10	10 1/8		.212	9.701	6.603	25.57	10.125 + .002 — .002
	*12	12 1/8		.254	11.617	9.88	36.69	12.125 + .002 — .002
Govt. Type "L" HARD 250 Lbs. Working Pressure	3/8	1/2	19	.035	.430	.0511	.198	.500 + .001 — .0005
	1/2	5/8		.040	.545	.0736	.285	.625 + .001 — .0005
	5/8	3/4		.042	.666	.0934	.362	.750 + .001 — .0005
	3/4	7/8		.045	.785	.1173	.455	.875 + .0015 — .0005
	1	1 1/8		.050	1.025	.1689	.655	1.125 + .0015 — .0005
	1 1/4	1 3/8		.055	1.265	.2281	.884	1.375 + .002 — .000
	1 1/2	1 5/8		.060	1.505	.2949	1.14	1.625 + .002 — .000
	2	2 1/8		.070	1.985	.4519	1.75	2.125 + .002 — .001
	2 1/2	2 5/8		.080	2.465	.6399	2.48	2.625 + .002 — .001
	3	3 1/8		.090	2.945	.8582	3.33	3.125 + .002 — .002
	3 1/2	3 5/8		.100	3.425	1.108	4.29	3.625 + .002 — .002
	4	4 1/8		.110	3.905	1.394	5.38	4.125 + .002 — .002
	5	5 1/8		.125	4.875	1.964	7.61	5.125 + .002 — .002
	6	6 1/8		.140	5.845	2.635	10.20	6.125 + .002 — .002
	8	8 1/8		.200	7.725	4.98	19.29	8.125 + .002 — .002
	10	10 1/8		.250	9.625	7.74	30.04	10.125 + .002 — .002
	12	12 1/8		.280	11.565	10.40	40.36	12.125 + .001 — .0005
Govt. Type "K" HARD 400 Lbs. Working Pressure	1/4	3/8	21	.032	.311	.0345	.133	.375 + .001 — .0005
	3/8	1/2	18	.049	.402	.0694	.269	.500 + .001 — .0005
	1/2	5/8	18	.049	.527	.0887	.344	.625 + .001 — .0005
	5/8	3/4	18	.049	.652	.1079	.418	.750 + .001 — .0005
	3/4	7/8	16	.065	.745	.1654	.641	.875 + .0015 — .0005
	1	1 1/8	16	.065	.995	.2165	.839	1.125 + .0015 — .0005
	1 1/4	1 3/8	16	.065	1.245	.2679	1.04	1.375 + .002 — .000
	1 1/2	1 5/8	15	.072	1.481	.3519	1.36	1.625 + .002 — .000
	2	2 1/8	14	.083	1.959	.5326	2.06	2.125 + .002 — .001
	2 1/2	2 5/8	13	.095	2.435	.7559	2.92	2.625 + .002 — .001
	3	3 1/8	12	.109	2.907	1.033	4.00	3.125 + .002 — .002
	3 1/2	3 5/8	11	.120	3.385	1.322	5.12	3.625 + .002 — .002
	4	4 1/8	10	.134	3.857	1.684	6.51	4.125 + .002 — .002
	5	5 1/8		.160	4.805	2.499	9.67	5.125 + .002 — .002
	6	6 1/8		.192	5.741	3.585	13.87	6.125 + .002 — .002
	*8	8 1/8		.271	7.583	6.689	25.90	8.125 + .002 — .002
	*10	10 1/8		.338	9.449	10.396	40.26	10.125 + .002 — .002
	*12	12 1/8		.405	11.315	14.92	57.76	12.125 + .001 — .0005

(*) All items prefixed with an asterisk are not carried in stock but are made only to order.

STREAMLINE

PIPE AND FITTINGS DIVISION
MUELLER BRASS CO.
PORT HURON, MICHIGAN

General Properties of STREAMLINE Copper Pipe

CLASSIFICATION	Nominal pipe size	Outside diam.	Stubbs gauge	Decimal equiv. of wall thickness	Actual inside diam.	Actual net copper area sq. in.	Weight per foot, lbs.	O.D. tolerance
TYPE "L" SOFT	3/8	1/2		.035	.430	.0511	.198	.500 + .001 — .0005
	1/2	5/8		.040	.545	.0736	.284	.625 + .001 — .0005
	3/4	7/8		.045	.785	.1173	.454	.875 + .001 — .0005
	1	1 1/8		.050	1.025	.1689	.653	1.125 + .0015 — .0005
	1 1/4	1 3/8		.055	1.265	.2281	.882	1.375 + .0015 — .0005
	1 1/2	1 5/8		.060	1.505	.2949	1.14	1.625 + .002 — .000
	2	2 1/8		.070	1.985	.4519	1.75	2.125 + .002 — .000
	2 1/2	2 5/8		.080	2.465	.6399	2.48	2.625 + .002 — .001
	3	3 1/8		.090	2.945	.8582	3.33	3.125 + .002 — .001
	3 1/2	3 5/8		.100	3.425	1.108	4.29	3.625 + .002 — .002
	4	4 1/8		.110	3.905	1.394	5.38	4.125 + .002 — .002
	5	5 1/8		.125	4.875	1.964	7.61	5.125 + .002 — .002
	6	6 1/8		.140	5.845	2.635	10.20	6.125 + .002 — .002
Govt. Type "K" SOFT	1/4	3/8	21	.032	.311	.0345	.133	.500 + .001 — .0005
	3/8	1/2	18	.049	.402	.0694	.269	.625 + .001 — .0005
	1/2	5/8	18	.049	.527	.0887	.344	.875 + .001 — .0005
	3/4	7/8	16	.065	.745	.1654	.641	1.125 + .0015 — .0005
	1	1 1/8	16	.065	.995	.2165	.839	1.375 + .0015 — .0005
	1 1/4	1 3/8	16	.065	1.245	.2679	1.04	1.625 + .002 — .000
	1 1/2	1 5/8	15	.072	1.481	.3519	1.36	2.125 + .002 — .000
	2	2 1/8	14	.083	1.959	.5326	2.06	2.625 + .002 — .001
	2 1/2	2 5/8	13	.095	2.435	.7559	2.92	3.125 + .002 — .001
	3	3 1/8	12	.109	2.907	1.033	4.00	3.625 + .002 — .002
	3 1/2	3 5/8	11	.120	3.385	1.322	5.12	4.125 + .002 — .002
	4	4 1/8	10	.134	3.857	1.684	6.51	5.125 + .002 — .002
	5	5 1/8		.160	4.805	2.499	9.67	6.125 + .002 — .002
	6	6 1/8		.192	5.741	3.585	13.87	8.125 + .002 — .002
	* 8	8 1/8		.271	7.583	6.689	25.90	10.125 + .002 — .002
	* 10	10 1/8		.338	9.449	10.396	40.26	12.125 + .002 — .002
	* 12	12 1/8		.405	11.315	14.92	57.76	

(*) All items prefixed with an asterisk are not carried in stock but are made only to order.

STREAMLINE Solders and Fluxes

Choice of Solder Depends Upon Working Temperatures, Not Working Pressures
How Hot Does Pipe Line Get in Service?

WORKING TEMPERATURE	Solder	Flux	Melting Range	Recommended Uses		Procedure for Making Joints
				Regular Fittings	Fittings with Locking Wire Joints	
Not over 250° F.	No. 50	No. 50	358°-414° F.	Plumbing, Drainage, Industrial Piping and Steam not over 15 lbs. pressure	Steam up to 50 lbs. (297° F.) Type "L" or "K" Hard Pipe	Refer to page 4
Not over 312° F.	No. 95 No. 104	No. 50	450°-460° F. 460° F.	Refrigeration and Air Conditioning Steam up to 65 lbs.	Steam up to 125 lbs. (353° F.) Type "L" or "K" Hard Pipe	Refer to page 4
Not over 387° F.	No. 114	No. 50	625°-740° F.	Steam up to 200 lbs. Type "K" Pipe not over 2 in. in size	Steam up to 250 lbs. (403° F.) Type "K" Hard Pipe	Heat joint evenly to at least 800°— Test temperature by applying solder to outside of fitting which should be hot enough to make solder flow readily— Do not apply flame direct to solder as oxidation will occur
Not over 475° F.	Phos. Copper or No. 122	Borax Water Paste or Fluxine	1300° F. 1250° F.	Steam up to 250 lbs. (403° F.) Refer all inquiries to office at Port Huron		Use Oxy-Acetylene Torch
Over 475° F.				Do not use copper		

STREAMLINE SOLDER FITTINGS



90° Elbow
Copper to Copper



Coupling
Copper to Copper



Coupling
Copper to Outside I. P. S.



90° Elbow
Copper to Outside I. P. S.



Coupling
Copper to Inside I. P. S.



Range Boiler Coupling



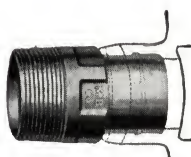
90° Elbow
Copper to Inside I.P.S.



45° Elbow
Copper to Copper



Range Boiler Elbow



Fitting Nipple
Fitting to Outside I. P. S.



Tee
Copper to Copper to Copper



Tee
Copper to Copper to Inside I. P. S.



Cross
Copper to Copper



Fitting Coupling
Fitting to Inside I. P. S.



90° Street Elbow
Fitting to Copper



45° Street Elbow
Fitting to Copper



Bushing
Fitting to Copper



Plug



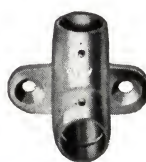
Cap



Eccentric Coupling
Copper to Copper



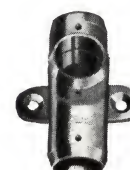
Drop Ear Elbow
Copper to Copper to Inside I. P. S.



Drop Ear Elbow
Copper to Copper



Drop Ear Tee
Copper to Inside I. P. S.



Drop Ear Tee
Copper to Copper to Copper

We manufacture a complete line of FORGED brass STREAMLINE Fittings for mechanical refrigeration and air conditioning applications.

Note: With few exceptions, or where existing demand does not require them, STREAMLINE Solder Fittings are furnished in full range from 1/4 in. to 8 in. inclusive. Our Catalog with complete detailed information on Streamline Copper Pipe and Fittings is available upon request.

OUTSTANDING ADVANTAGES of STREAMLINE Copper Pipe and STREAMLINE Solder Fittings

Elimination of Threaded Connections

Piping Systems commonly used in the past for plumbing and heating have required labor consuming threaded connections. The STREAMLINE Copper Pipe and Fittings are the first practical solution of a permanently tight, easily made soldered connection. By the elimination of the cut thread the strength of the tube or pipe is not reduced at the connections—the STREAMLINE Fitting and the completely soldered connection actually increase the strength.

Permanence

Made of 99.90 per cent pure copper, STREAMLINE Copper Pipe is permanently non-corroding except under extremely unfavorable conditions seldom encountered. It is hard drawn and is shipped in 20-ft. straight lengths. Being hard drawn it retains its fine straight appearance and when installed there are no kinks, ripples or bends.

It requires no more hangers or supports than an ordinary iron installation—it actually weighs less.

With soft copper pipe there is always the danger of driving nails through it during the process of lathing, etc. With STREAMLINE Hard Copper Pipe (Types K, L, and M) tests conclusively show that its hard surface readily deflects nail points.

Installations of materials that rust away and corrode will, at best, last but a few years depending upon the nature of the soil or water and will then

have to be replaced. In many cases corrosion and rust will start almost immediately, gradually decreasing their service and cutting down the flow capacity. At the end of a few years they have no salvage value. An installation of STREAMLINE Copper Pipe and STREAMLINE Solder Fittings will continue to give uninterrupted permanent capacity service.

Conservation of Space in Construction

Space saving is of major importance to both architect and owner. STREAMLINE Copper Pipe and Fittings require approximately 30 per cent less space than other materials—no room is required for wrench grip or swing necessitated by screwed fittings. A STREAMLINE Solder Fitting, although enormously strong, is little larger than the pipe itself. An installation of STREAMLINE Copper Pipe and Fittings can be placed close to walls, partitions or ceilings, and thus decreases space for vertical pipe shafts and horizontal pipe spaces.

Absence of Noise in STREAMLINE Installations

The smooth interior of the STREAMLINE Pipe and the absence of turmoil at the recessed fittings make for extreme quietness when water is running through it. This quality of silence is greatly desirable in residences, and particularly in apartment and hotel buildings where the noise created by water traveling through most piping systems is a source of considerable annoyance to people in adjoining rooms.

For Repair and Replacement Work

An installation of STREAMLINE Copper Pipe and Fittings cannot rust. They are ideal for replacement work and last a lifetime without further attention.

The cost of STREAMLINE Copper Pipe and Fittings is approximately the same as iron but costs very much less than iron in repair jobs, owing to the fact that it is not necessary to tear up large areas of wall and flooring to make a replacement. The removal of a base or floor board is generally all that is necessary.

TYPE L and **TYPE K** STREAMLINE Copper Pipe is pliable enough to be easily bent and worked around projections. It may be readily run between studding, over or under electric conduits, by manipulating and bending the pipe in almost the same

way as an electrician installs an electric cable. A STREAMLINE installation requires less room than any other material for the same purpose. A joint made with STREAMLINE Solder Fittings and Copper Pipe is the strongest part of the installation. There is no danger of future leakage at these points.

STREAMLINE Copper Pipe is provided in both hard and soft tempers and either or both may be used to advantage. **TYPES O, M, L and K**, hard temper STREAMLINE Copper Pipe are particularly suitable on some of the larger jobs where utility corridors or large partition areas are available. In these cases, straight length runs are easily handled and the compactness of the STREAMLINE Fitting, which is very slightly larger than the pipe itself, makes an exceptionally handsome job.

TESTS

Expansion and Contraction—Sections of $\frac{3}{4}$ -in. STREAMLINE Copper Pipe were connected with STREAMLINE couplings making a total length of 36 ft. containing 14 joints. Cold water was run through the Pipe for 15 seconds alternated with 100 lb. of steam at 339° F. This alternating test of steam and cold water was run continuously until 20,160 complete cycles had been effected. After a thorough inspection there was not the slightest sign of any damage or leak in the connection. This test was a very severe one and in view of the results obtained should satisfactorily answer any questions as to its dependability under service conditions.

Vibration—A test to determine the effect of continued vibration on connections made with STREAMLINE solder fittings to STREAMLINE Copper Pipe was conducted as follows:

The test was run on a 10-ft. length of $\frac{3}{4}$ -in. vertical pipe which contained nine joints; the lower end was held rigid. The upper end of the pipe was attached to a vibrator. The vibrator was set in motion and run continuously day and night for one week. The pipe was subjected to 850 vibrations per minute, totaling 8,568,000 vibrations over the test period with not the slightest sign of failure.

TESTS

Tensile Strength—Two pieces of $\frac{3}{4}$ -in. iron pipe were screwed into a coupling and pulled on the Olsen testing machine. Repeated experiments showed that the threads fractured at about 6,400 lbs.

Extra-heavy STREAMLINE Copper Pipe soldered into STREAMLINE couplings and subjected to the same test resulted in a fracture of the pipe itself at slightly over 9,000 lbs. but showed not the slightest sign of joint failure.

Deflection or Bending—Two pieces of $\frac{3}{4}$ -in. iron pipe size brass pipe 6 in. long were screwed into a coupling and placed over supports $5\frac{3}{8}$ in. center to center. A deflection test showed that the thread failed at $1\frac{1}{8}$ in. from horizontal.

The same test was carried out on two 6-in. pieces of Standard and Extra-Heavy STREAMLINE Copper Pipe and after being bent to a 45° angle the joint was still intact.

Heat Loss from Wrought Iron or Steel Pipe Is Approximately Twice That from STREAMLINE Copper Pipe

A STREAMLINE Copper Pipe and Solder Fittings installation emits very little heat by radiation and in hot water lines, steam lines, etc., can be very often advantageously installed **without insulation**.

There are two causes of heat loss from a pipe line, one is radiation and one is convection. Hard copper will have a radiation loss of about one-sixth that of black pipe but the loss by convection, which will be nearly alike on both, will bring the total heat loss from copper to less than half that of black pipe. This reduction frequently justifies the use of hard copper pipe without covering instead of covered steel pipe or wrought iron. This is particularly true where space is valuable, as it is in all large buildings. The smaller uncovered pipe not only takes little room but has a most handsome appearance. This question of covering must be considered on each job by itself. When a line is exposed to strong air currents or is over large outside doorways or places where convection loss would be high, it should be covered.

Not only many small jobs but many large ones, apartment houses, hotels and school buildings are installing heating systems with all copper lines and considering the saving by the use of smaller pipe sizes and saving of covering, their cost compares favorably with former practice.

Many contractors after completing a heating installation of STREAMLINE Copper Pipe and Fittings, polish the pipe and give it a light coat of

thin lacquer. The preparatory cleaning is readily accomplished by the use of steel wool and gasoline. The lacquering keeps the pipe, in the majority of cases, permanently bright and lowers the heat emission.

Copper heating surfaces are widely used at present, especially in the form of finned tubes for convection heat transfer or as exemplified in the numerous convection types of exposed and concealed radiators. It is interesting to note that, without exception, when brass and copper surfaces are successfully used for heat transfer, the effective radiation area is necessarily greatly increased, as by the use of fins, and a current of air must be kept steadily moving over such surfaces; this current being provided either by power-driven fans or by natural convection or stack draft action such as may be effected by heated flues above the warm surfaces.

The users of concealed heaters built into the walls under the windows have learned the importance of the height of the heated flue. When air ceases to travel over the smooth surface of heated copper pipe, heat transfer ceases to a great extent.

Although copper pipe surfaces radiate very little heat, copper itself is a very rapid conductor of heat. Therefore it naturally follows that there is considerably less loss of heat when being conveyed from the point of generation to the points of distribution.

COST COMPARISONS

STREAMLINE Solder Fittings and Copper Pipe in certain installations may cost a little more than ordinary threaded iron pipe and fittings—but the possible extra cost is so little considering the trouble-free service it gives that it is relatively unimportant. For instance, in the average 6 to 8 room house costing from \$5000 to \$8000, the added cost of the STREAMLINE installation would range from about \$15 to \$30, depending, of course, on the extent of the plumbing and heating system.

This extra cost is probably less than $\frac{1}{2}$ of 1% of the value of the house and for this the owner is getting lifetime trouble-free service. It is practically

everlasting under ordinary conditions of soil and water. In a very few sections of the country where the water is acidulated owing to certain elements in the soil through which the water passes, it may attack the pipe but even under these conditions it will last a great deal longer than iron, which rusts under any condition. The first cost of installing STREAMLINE is the only cost.

A STREAMLINE Copper Pipe and Solder Fittings installation is, of course, much lower in cost than threaded brass or copper pipe, the wall of which must be a great deal thicker to accommodate the threading than is required in actual service.

STREAMLINE COPPER PIPE AND FITTINGS FOR PLUMBING, HEATING, AIR CONDITIONING, AND INDUSTRIAL USE

Sales Branches and Representatives

ALBANY, NEW YORK

H. A. McDermott
 Hampton Manor, Rensselaer (Suburb)

ATLANTA, GEORGIA

Wm. Rapp, Jr. 1109 Peachtree St.

BIRMINGHAM, ALABAMA

Gordon R. Jones 411 Yorkshire Dr., Hollywood

BOSTON, MASSACHUSETTS

A. V. Huntley, Jr.
 1255 Little Bldg., 80 Boylston St.

BUFFALO, NEW YORK

The J. M. & L. A. Osborn Company . 64-86 Rapin St.

*CHICAGO, ILLINOIS

Mueller Brass Co. 3403 W. 48th Place
 Steel Sales Corporation . . . 129 So. Jefferson St.

CINCINNATI, OHIO

H. L. Hill Box 6, Station O

CLEVELAND, OHIO

Mueller Brass Co. (P. L. Craft) (R. H. Simons)
 4500 Euclid Ave.

DALLAS, TEXAS

C. E. Grant 1400 Allen Bldg.

DAYTON, OHIO

Mueller Brass Co. 407 Dayton Industries Bldg.

DENVER, COLORADO

A. B. Crosby 545 Emerson St.

DETROIT, MICHIGAN

Hunter-Wilkie Co. 2842 W. Grand Blvd.

FLANDREAU, SOUTH DAKOTA

W. B. Campbell 214 E. Pipestone Ave.

FLINT, MICHIGAN

George A. Reamer 20 Dort Bldg.

HARRISBURG, PENNSYLVANIA

P. H. Berry 917 No. Second St., Phone 43294

INDIANAPOLIS, INDIANA

A. B. Alexander 501 Fidelity Trust Bldg.

J. M. Anderson 3444 Pennsylvania St.

KANSAS CITY, MISSOURI

R. W. Young 708 W. 47th St.

LANSING, MICHIGAN

B. A. Devine 731 No. Capital Ave.

*LOS ANGELES, CALIFORNIA

Norman S. Wright & Co. . . . 923 E. Third St.

MILWAUKEE, WISCONSIN

H. M. Zentner 647 West Virginia St.

MINNEAPOLIS, MINNESOTA

C. E. Hill 529 So. Seventh St.

*NEWARK, NEW JERSEY

Mueller Brass Co. (A. P. Relken) . . .
 271-277 Badger Ave.

PHILADELPHIA, PENNSYLVANIA

H. L. Hess Co.
 937 Drexel Bldg., 5th and Chestnut Sts.

N. S. PITTSBURGH, PENNSYLVANIA

Wm. M. Orr Company 1228-30 Brighton Road

*SAN FRANCISCO, CALIFORNIA

Norman S. Wright & Co. 250 Perry St.

SARASOTA, FLORIDA

I. G. Archibald P. O. Box 30

*SEATTLE, WASHINGTON

Norman S. Wright & Co. 608 Pioneer Bldg.

ST. LOUIS, MISSOURI

E. H. Joern 4067 Park Ave.

WASHINGTON, D. C.

E. E. Sutter 6705 6th St., N. W.

CANADIAN SALES AND MANUFACTURER

TORONTO, CANADA Canada Wire & Cable Co., Ltd.

REPRESENTATIVE IN MEXICO

George F. Gilfrin Edificio "La Nacional," 608 Mexico, D. F.

*Branches marked * carry warehouse stocks in addition to the main plant at Port Huron, Michigan.

STREAMLINE
 PIPE AND FITTINGS DIVISION
MUELLER BRASS CO.
 PORT HURON, MICHIGAN